Decision Quality for Exploration Well Path Optimization

Arlington, 14.April.2024

OMV

Four slide summary of a four-year ODQ Implementation Program

01 Opportunity Statement

02 Implementation Maturation Model

03 Relevant ODQ Program Steps

04 Implementation Workstreams

Benefits of Implementing Organizational Decision Quality

We see the opportunity to achieve quantifiable improvements in terms of

Speed, **Value**, **Consistency**, and **Transparency**

of the decision making in OMV's Upstream project portfolio

New Ways of Working:

- ODQ is about **changing the dynamic of how we interact** with each other to promote **clarity in ownership, empowerment, accountability, transparency,** and **integration**

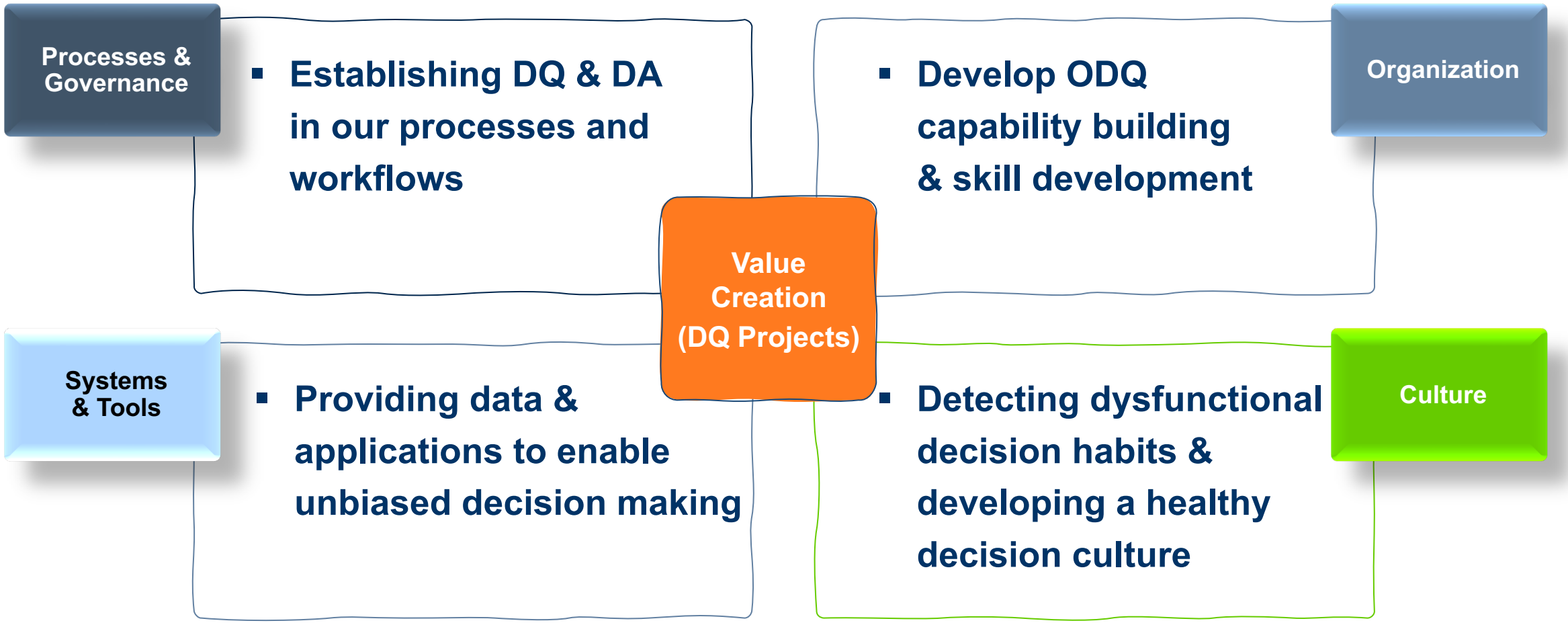
Stepwise Maturation Model defines Goals & Resource Allocation

Start of OMV's ODQ initiative

Team Dynamics in a Major Capital Project triggered ODQ

ODQ Implementation Workstreams

Multiple parallel aspects drive the ODQ Implementation



DQ Pioneers in OMV Exploration

DQ Steering Committee

Paul Owen

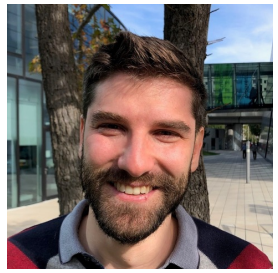
Greg Rock

Peter Krois

DQ Implementation Team

Walter Kosi

Ute Sattler



Eddie Kwiecinski

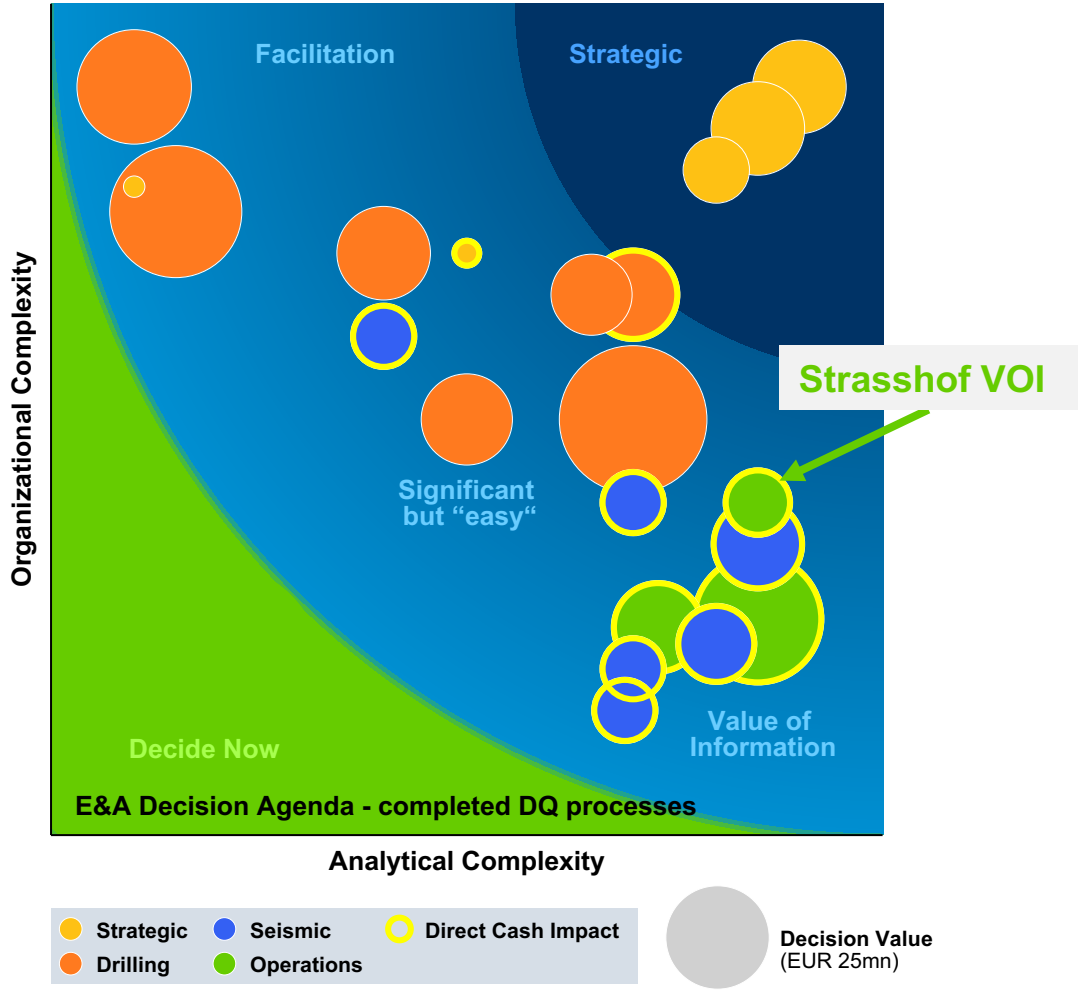
Ralph Hinsch

Michael Bierbaumer

The Total Value of the completed decisions is EUR 400mn

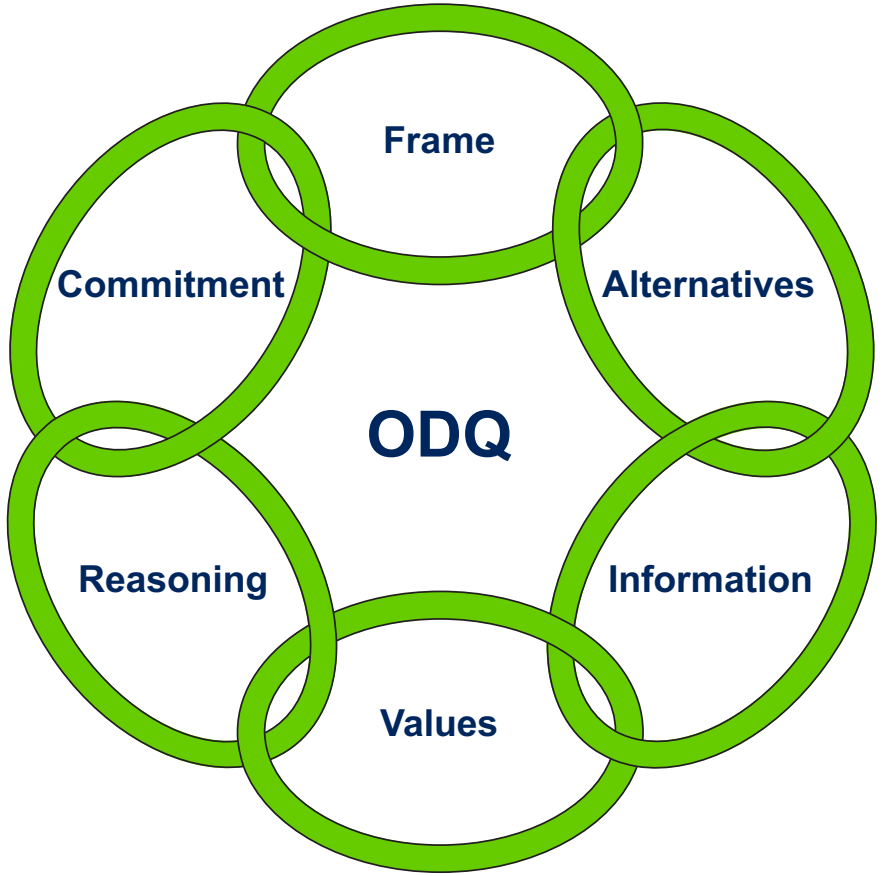
Decisions benefit mostly from:

- Getting clarity through **framings** and **alignment of stakeholders**
- **Progressive dialogue process** towards decision finding: **No recycling of activities**
- A more **comprehensive assessment of alternatives and its quantification**



Decision Quality in OMV - Exploration

Strasshof T 17 Well Path – Case Study from Austria



Recycled Project which Did NOT Pass the Tollgate Committee

Prior to the Framing

- The existing well path **with the Pilot hole, was NOT approved** by the tollgate committee

Problem Statement

*What is **the best way to drill the Strasshof T 17** exploration well?*

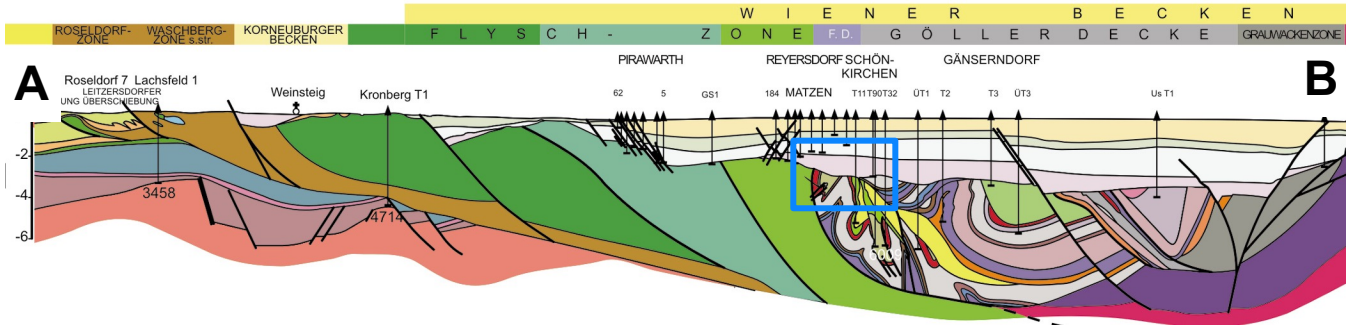
- How to **integrate the structural uncertainties** into the decision tree?
- How to **compare / rank various geological scenarios?**

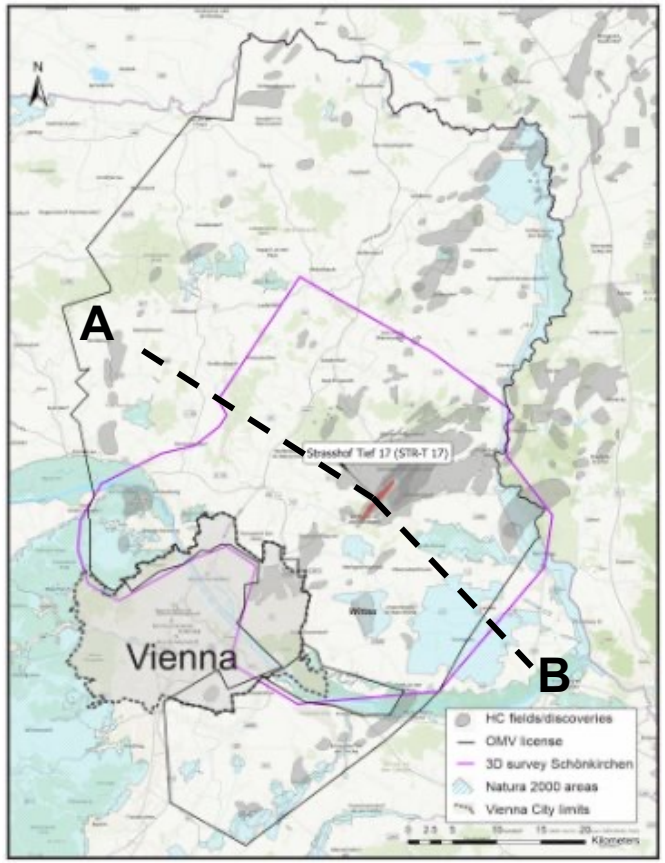
WHY: New Subsurface Concept to tap into Undrained Resources

- **STR-T 17** is a **well drilling** project in the **Northern Calcareous Alps** below the Vienna Basin

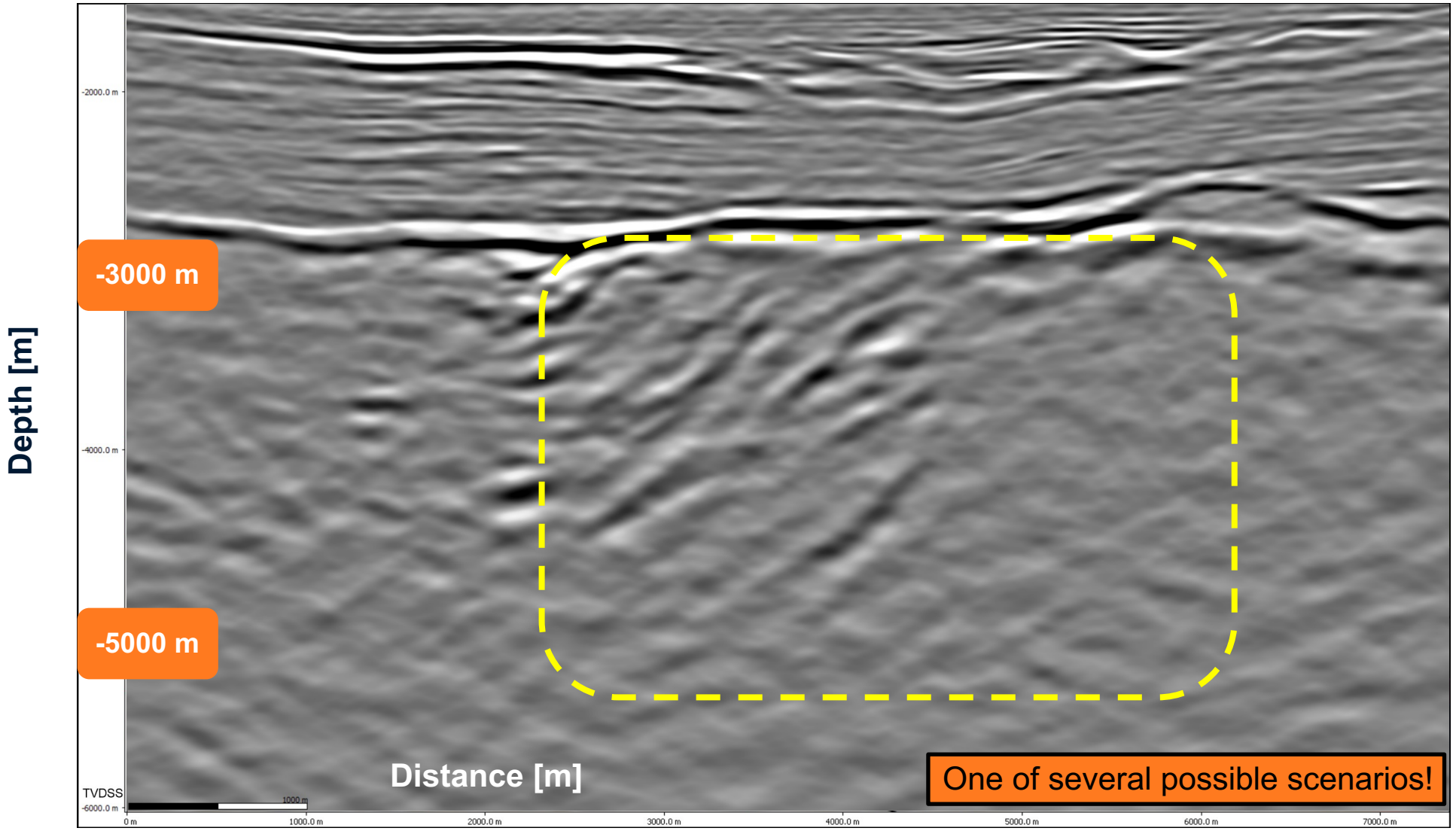
- The **Strasshof field** was discovered in **2005**
- Most subsequent wells had **technical issues** due to complex geology or issues due to **reservoir performance**

- **HOW: Drain the Upper Reservoir via the Lower Reservoir**
  (Exploration target: Coarse clastics)





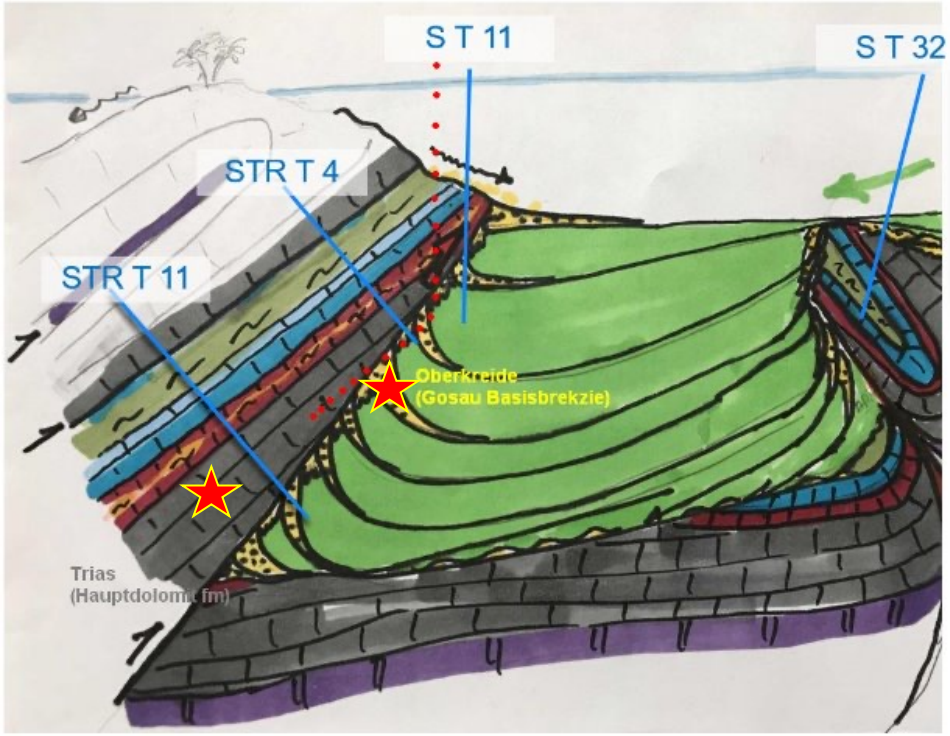
Seismic Section: Challenging Subsurface

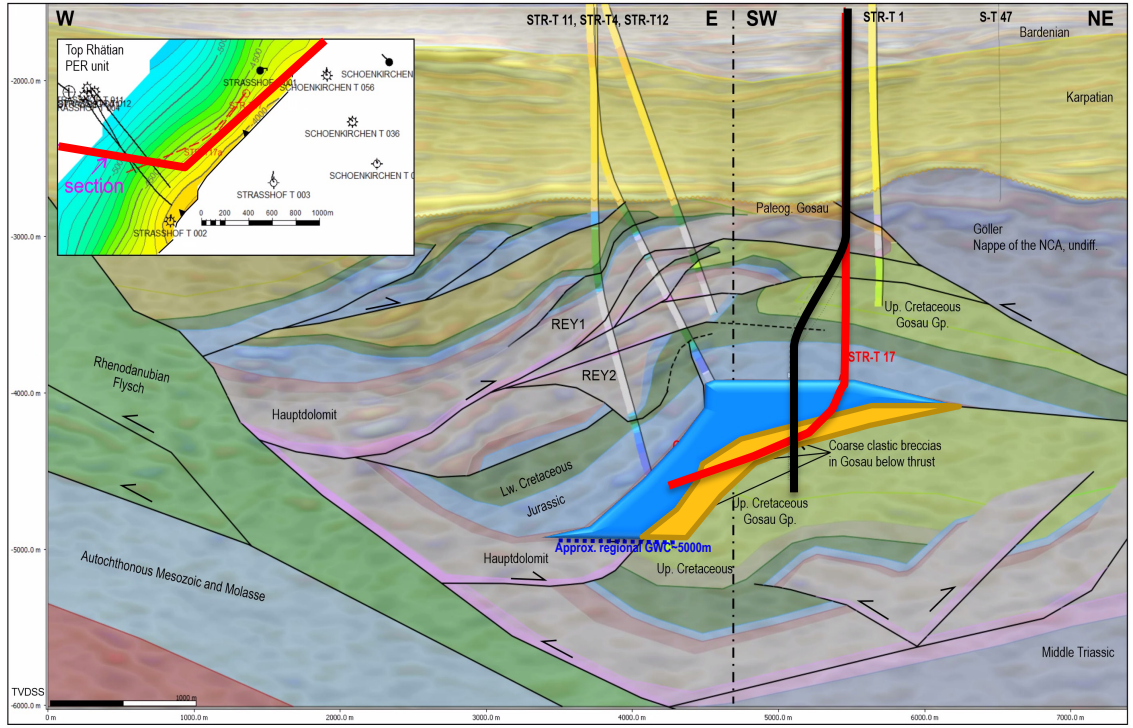


Initial well path with Pilot Hole to Minimize Subsurface Uncertainties

HOW: Drill the **Pilot hole** to 1. **Appraise** the Upper Reservoir 2. **Explore** for the Lower Reservoir

3. **Fix coordinates** for placing **subsequent Appraisal and Production well**





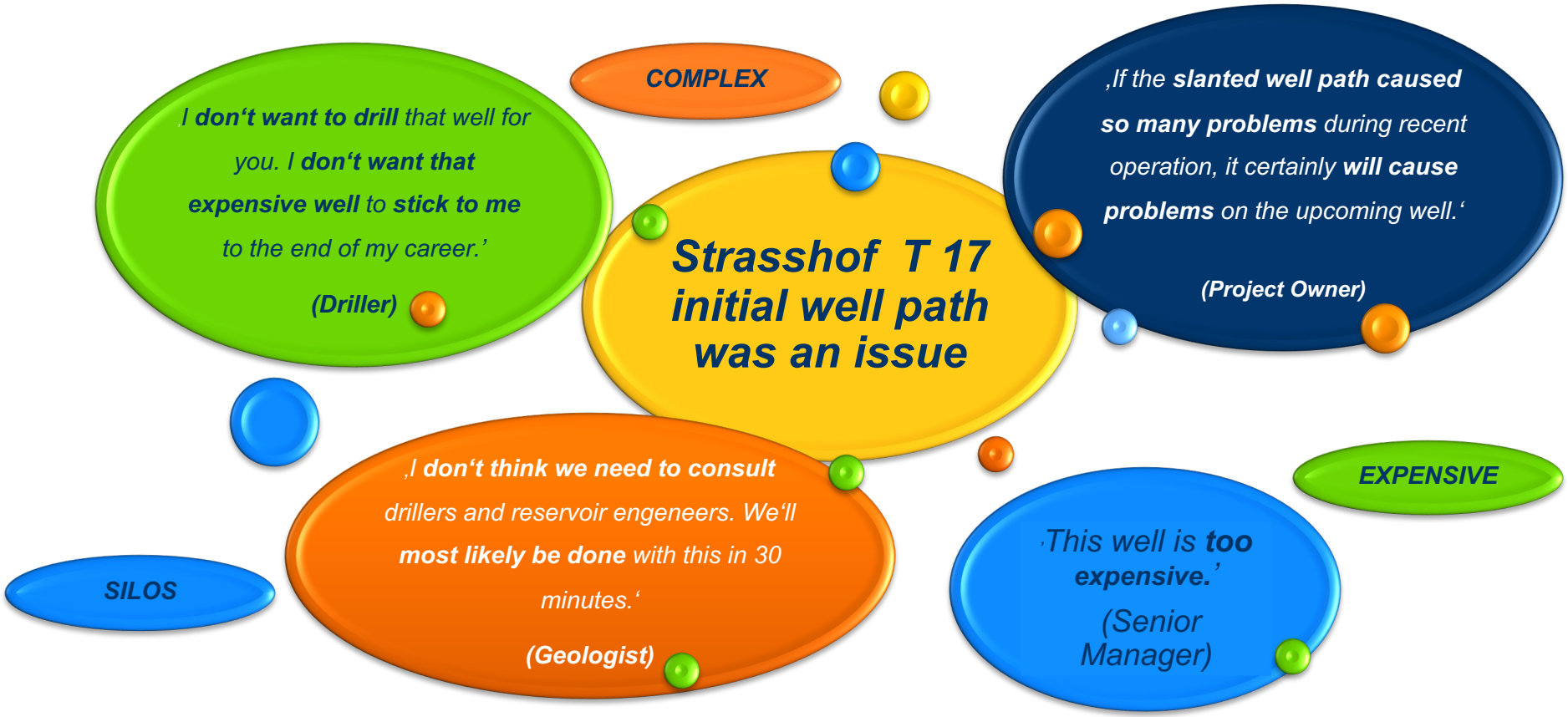
Pilot hole

Production well

Upper Reservoir

Lower Reservoir

Before the Framing: Mindsets, Biases, Silos



Decision Challenge: Do we need the Pilot Hole?

Before the Framing

- **The existing well path with the Pilot hole did not pass the tollgate committee**
- Strong push to **review and reassess the Pilot well concept** due to:
  - **Subsurface uncertainties** - lessons learnt from previous wells
  - **Complex** operations - Drilling **two long sections**
  - **Expensive** operations

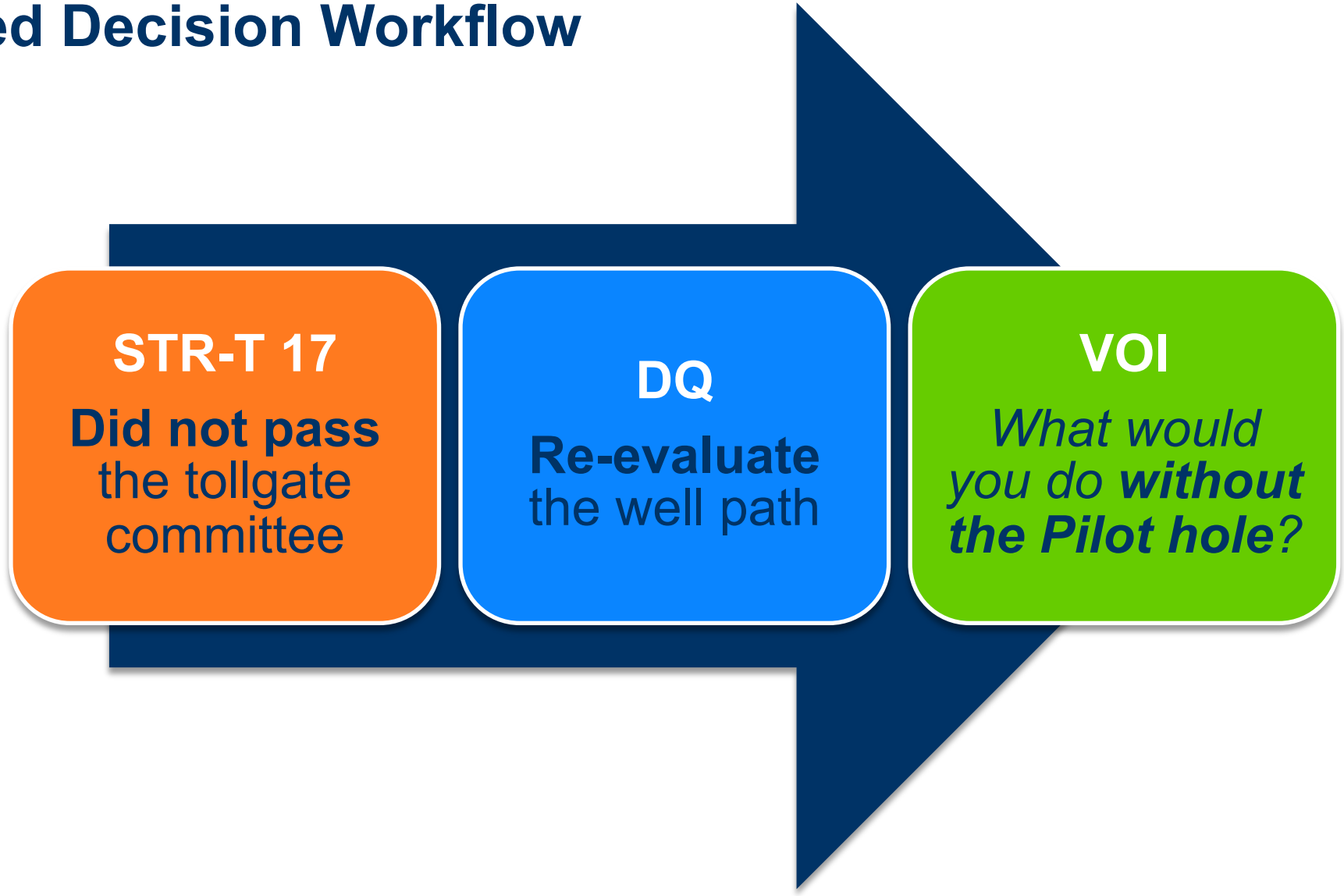
Decision to run DQ with the following goals:

- **Re-evaluate** the pilot hole concept
- **Align & engage** all the stakeholders

Decision Frameworks helped the team to **identify this as a Value of Information (VOI) decision challenge:**

- VOI decisions require incremental economic analysis, where:
- **VOI = Value with information – Value without information**
- To evaluate **the value without information**, we needed to understand: ***What would we do without the pilot hole?***

Simplified Decision Workflow



Build & Evaluate a Base Case Without a Pilot

During the Framing, **alignment** on what we wanted to achieve:

- **Find the best** drilling concept?
- **Evaluate** the whole project?
- **Compare** drilling concepts?

Givens

- **Surface Location**
- Well **always ends** in the Upper Reservoir
- Drill in **two sections.**
- Drill **no steeper than 70⁰** in 8.5“ section

Decision Criteria

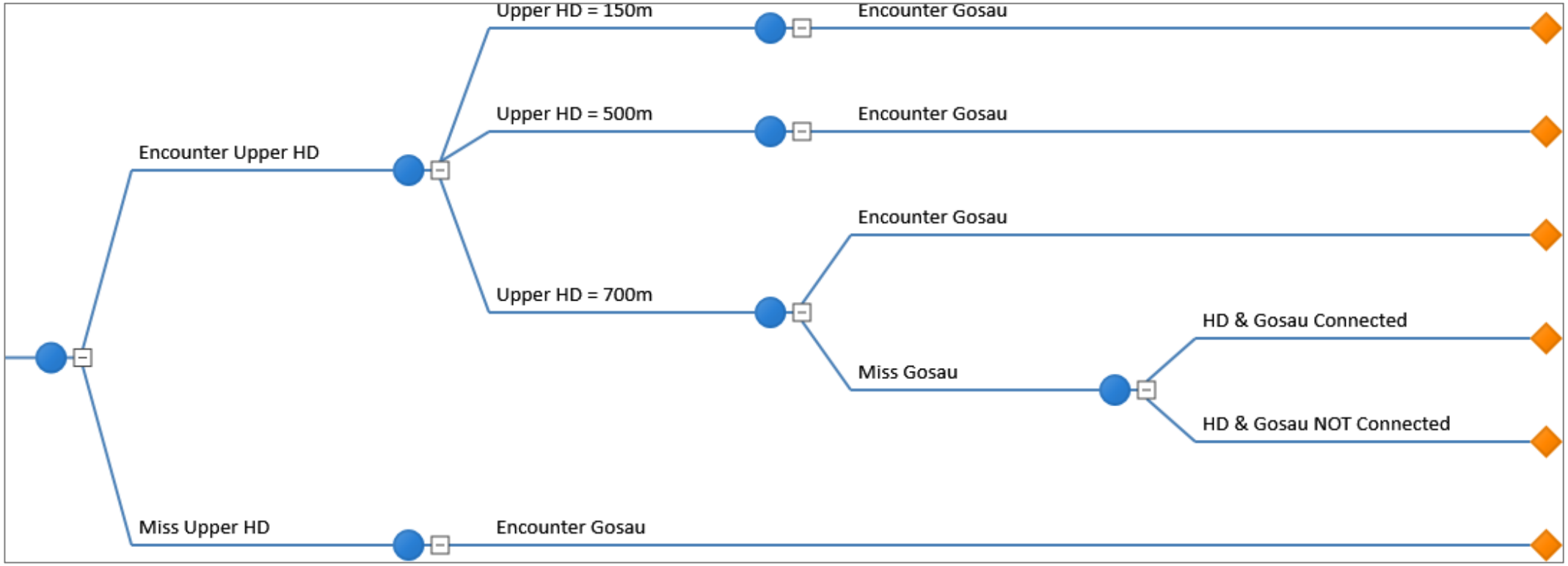
- Economic **Value**
  - **Reservoir potential** (volumes, contribution from both reservoirs, productivity)
  - **Well cost**
- Chance of **negative outcomes**
- Well **complexity** / drill-ability

Main Uncertainities

- 3D Position of the **Trap** / **Structure**
- **Connectivity** of the Upper and the Lower Reservoirs
  - Would it be **possible to produce** from both reservoirs out of one well?

Yes - No Decision Tree Does Not Represent the Real Complexity

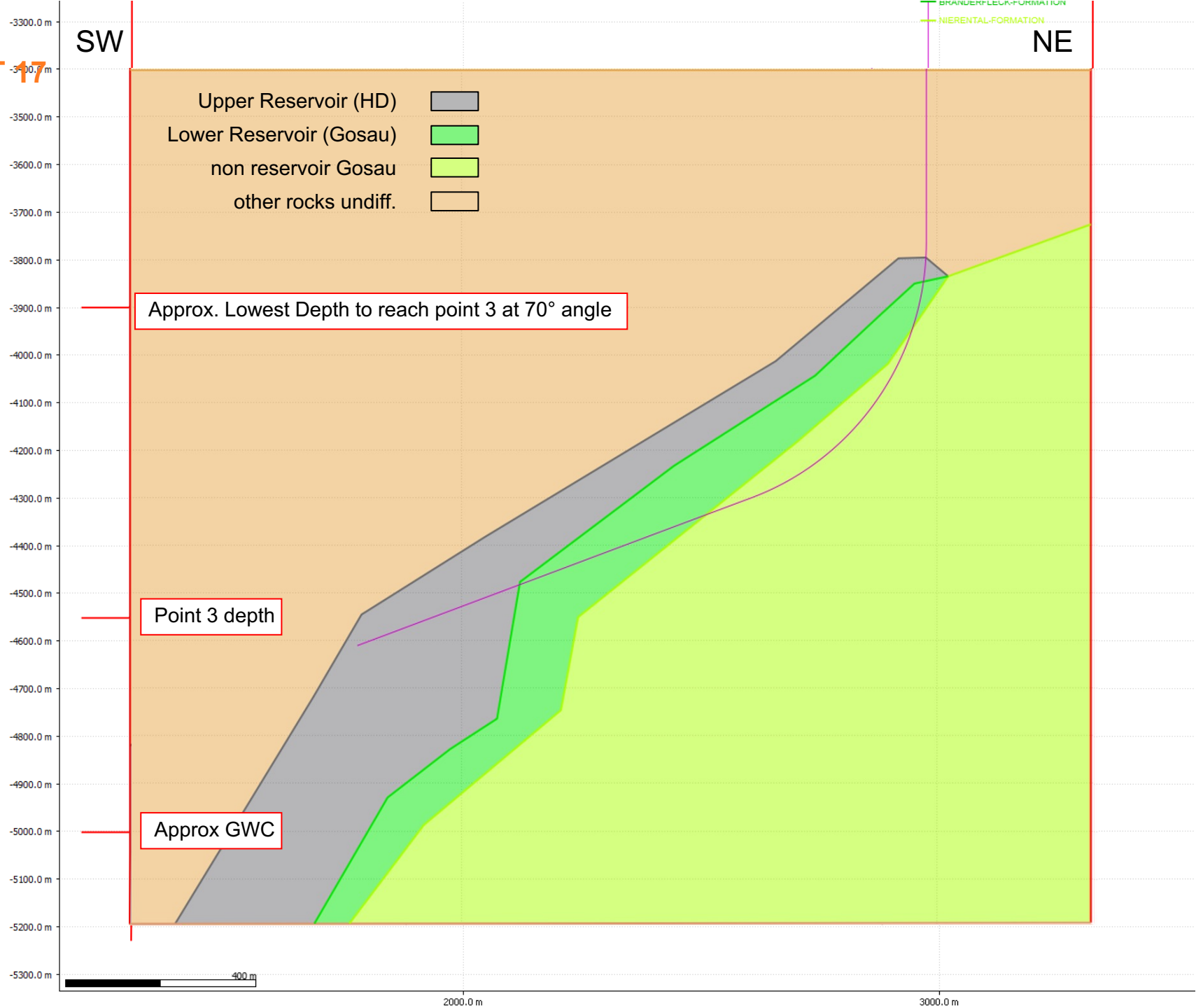
- **Decision Criteria:** Encountering Upper Reservoir (HD) **Yes-No,** encountering Lower Reservoir (Gosau) **Yes-No**



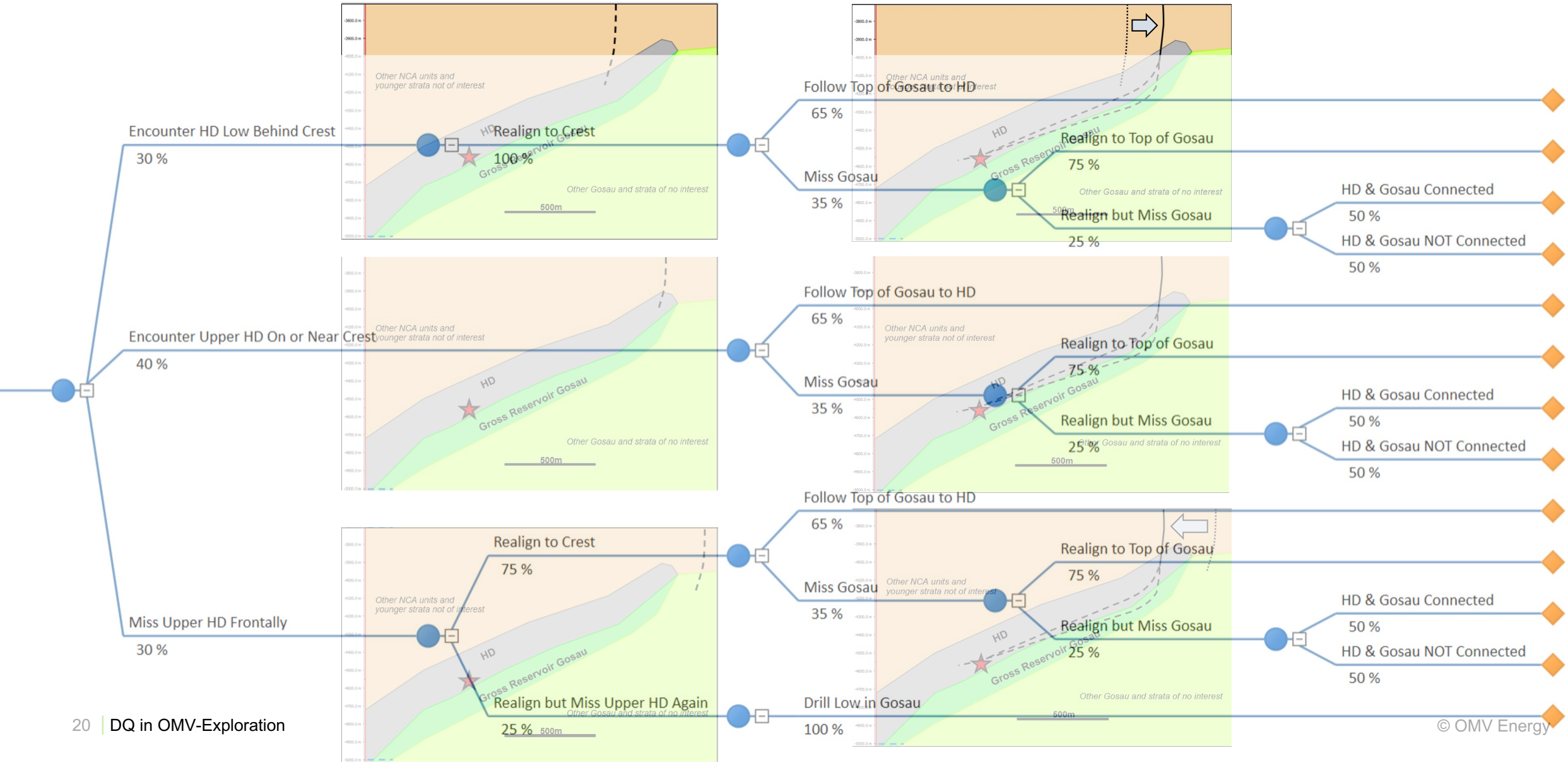
Possible Scenarios

Given:

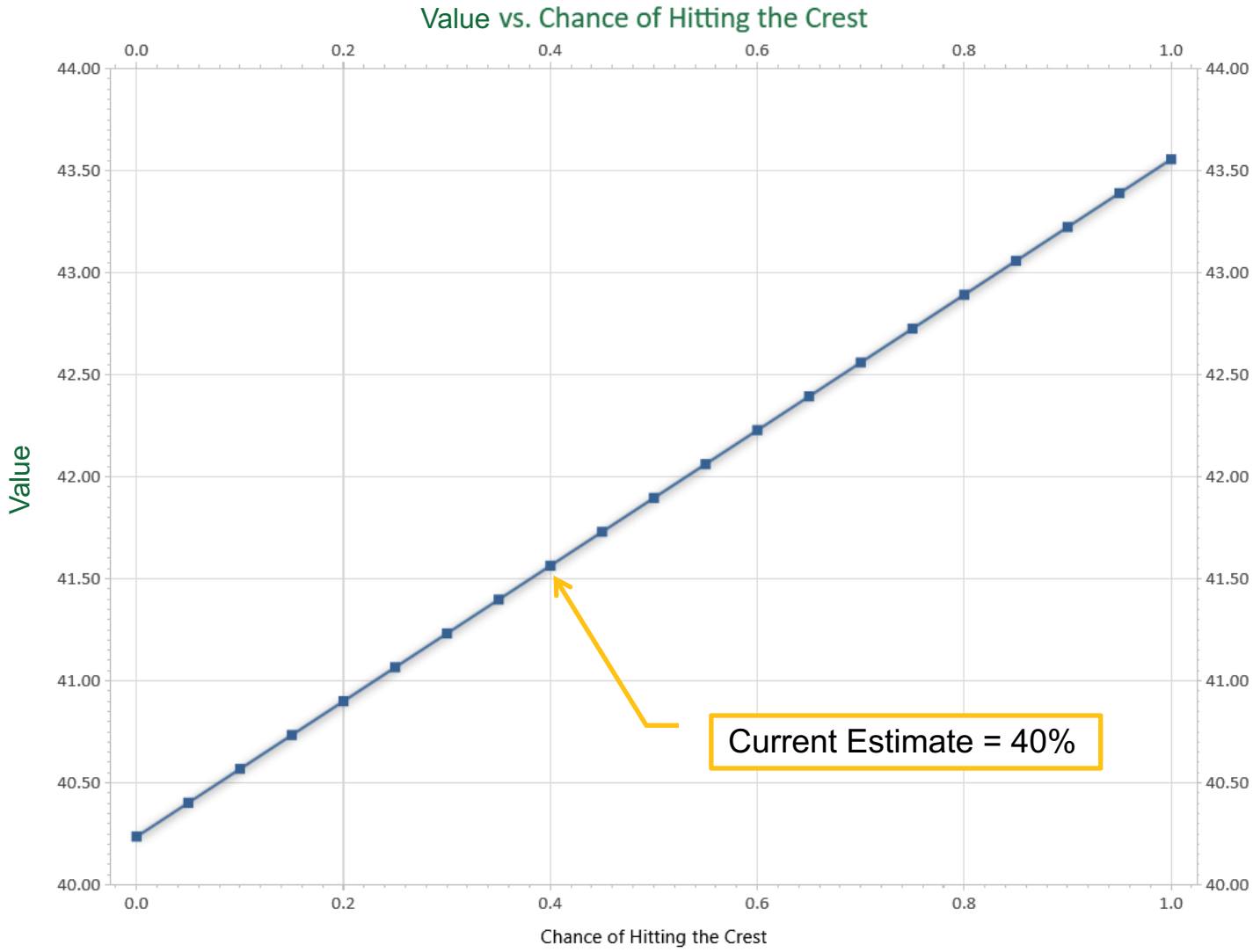
- Drilling in two sections **would always allow to take decisions,** based on the outcome of the drilled section
- Implemented into the base case



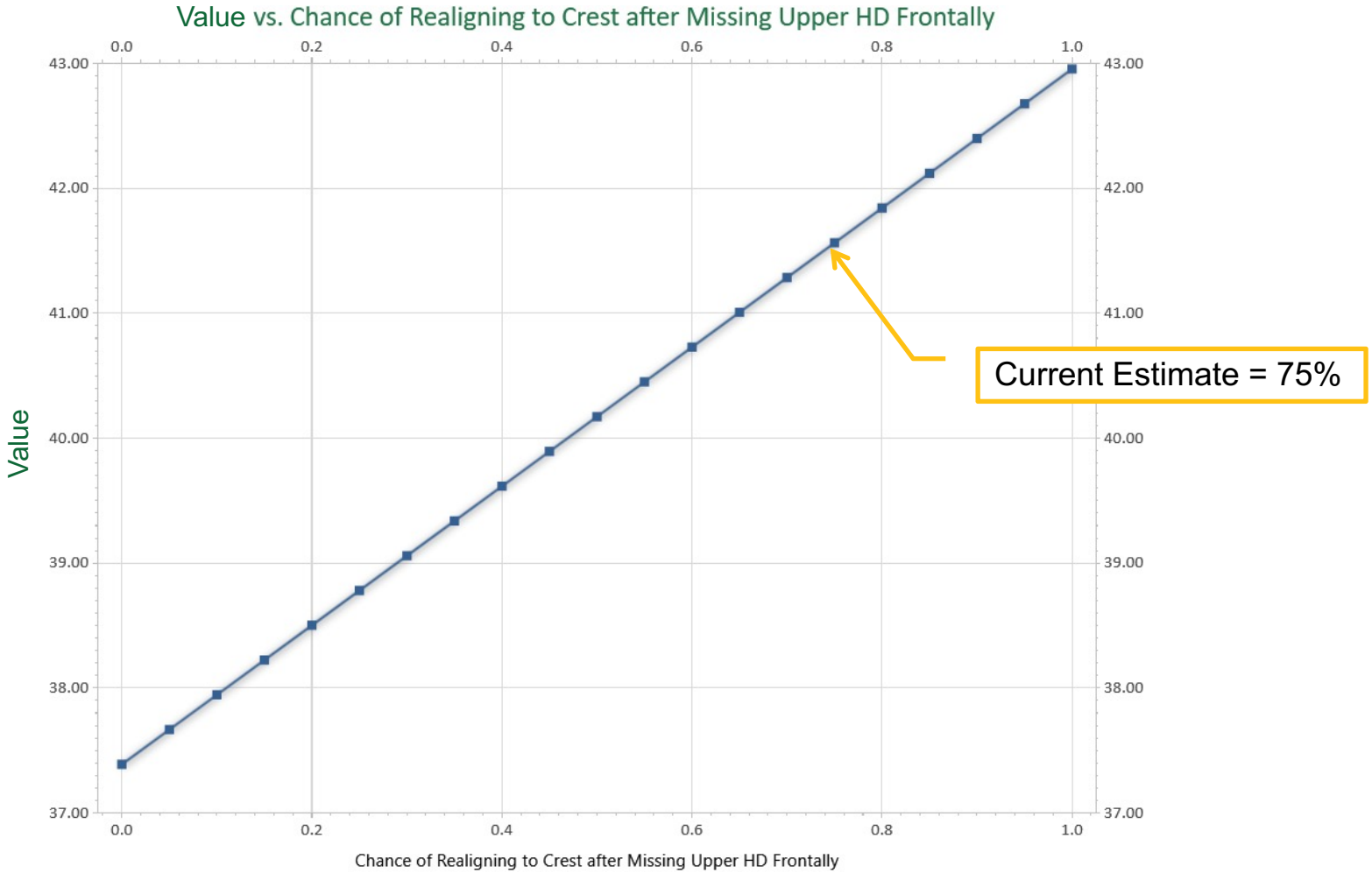
Building a Decision Tree for a Base Case V2



Sensitivity check: Chance of Hitting the Crest (12”)



Sensitivity check: Chance of Realigning to the Crest after Missing the Upper Reservoir (HD) Frontally (12”)



What Have we Learned During the Analysis?

- As the Upper Reservoir **will always be drilled,** there are **no absolute negative** outcomes
- Chance of realigning to the crest after missing it frontally are at **75%**
- **Only 11.5% of scenarios** result in reduced **NPVs**
- The alternative **drilling concept reduces** the well cost **significantly**

DQ Proved to be a Powerful Tool

Management Approval

- The **new drilling concept WAS approved** by the Tollgate Committee
- The **various** assumptions were economically validated

Team Alignment

- The **systematic approach provided the team with insights** that they not have had before
- The DQ workflow **was a very good team building** and **aligning exercise** (Geo, WE, RE, Mgmt.)

For the Upcoming Operations

- The **decisions *were broken down*** to the individual sections
- **Decision trees have been designed** to facilitate the swift decision-making during operations

DQ Caught *Decision Maker's* Attention

DQ proved to be a **powerful tool to analyze**,

decompose and clarify complex (exploration) problems,

thus, **simplifying** and **adding value** to decisions.